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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,303	12/11/2001	Robert M. Hilton	MTB001US	1419

27906 7590 08/19/2003

PATENT LAW OFFICES OF DAVID MILLERS  
6560 ASHFIELD COURT  
SAN JOSE, CA 95120

EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 08/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/683,303

Applicant(s)

HILTON ET AL.

Examiner

James Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 9-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 19-24 is/are allowed.
- 6) ☒ Claim(s) 9-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 9, 10, 16 and 17 under 35 U.S.C. 102(e) as being anticipated by Glenn (US 6,472,598).

Glenn (Fig 5) discloses a method for packaging an integrated circuit die, IC, comprising: attaching the die (20) to a substrate (220) so that metal bumps (523a) on the die contact conductive traces (522a) on a first face (top) of the substrate and an edge of the die lies above an BGA (242) on a second surface (bottom), forming a dam (228) on the first surface by depositing (Col. 2, Lines 22-25) an inherent flexible material on the substrate and curing the flexible material (Col. 4, Lines 64-67) with a width between one and two times the pitch of the BGA on the substrate, filling a volume of underfill material (232) between the die and substrate and between the die and dam with an underfill material wherein an edge of the underfill material overlies the BGA; and inherently positioning the dam way from the edge of the die by a separation greater than about twice the pitch of the BGA.

### *Claim Rejections - 35 USC § 103*

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9, 12, 13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bolken (US 2003/0038381).

Bolken (Fig 4, 5) discloses a method for packaging an integrated circuit die, IC, comprising: attaching the die (112) to a substrate (120) so that metal bumps (116) on the die contact conductive traces (94) on a first face (top) of the substrate and an edge of the die lies above an array on a second surface (bottom), forming a dam on the first surface comprising inherently treating a region of the substrate by removing a portion of the substrate (Par.0030) and filling a volume of underfill material (140; Par. 0038) between the die and substrate and between the die and dam with an underfill material, wherein an edge of the underfill overlies an array; wherein the treated region has a higher affinity to the underfill than does an adjacent region, such that the treated region limits flow of the underfill; wherein filling limits the underfill to a level below a top surface of the die.

Bolken does not appear to explicitly show the die and encapsulant overlying a Ball Grid Array.

However examiner takes official notice that ball contacts were well known in the art at the time the invention was made and that it would have been obvious to

incorporate balls on the array of pads formed on the second surface of Bolken's substrate in order to communicate with the die package.

Claims 9, 11, 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. (5,450,283).

Lin (Fig 1-3,6) discloses a method for packaging an integrated circuit die, IC, comprising: attaching the die (22) to a substrate (12) so that metal bumps (26) on the die contact conductive traces (14) on a first face (top) of the substrate and an edge of the die lies above an BGA (Fig 6,42) on a second surface (bottom), forming a dam (34,32) on the first surface by attaching an inherent preformed dam that has a width between one and two times the pitch of the BGA on the substrate, filling a volume of underfill material (30) comprises applying a liquid underfill into the volume until the underfill material has a wetting angle less than 45 degrees down from a top surface of the die (via flush with top surface) and the wetting angle less than 45 degrees down from a top surface of the die (via flush with top surface) and top surface of dam.

While Lin does not appear to disclose attaching BGA prior to encapsulation, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular claimed sequence because applicant has not disclosed that the limitation is for a particular unobvious purpose, produces an unexpected result, or is otherwise critical. Moreover, it is well established that, in a well known process, the order of performing process steps is prima facie obvious in the

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absence of new or unexpected results. Ex parte Rubin 128 USPQ (PO BdPatApp 1959).

***Allowable Subject Matter***

Claims 19-24 are allowable.

The following is a statement of reasons for the indication of allowable subject matter: the prior art does not disclose or make obvious treating the substrate such that a liquid has a higher affinity for first portion of the substrate that surrounds an area where die attaches and a lower affinity for a second portion that surrounds the first portion wherein the higher affinity first portion causes the fill material to bead on the first portion including all the limitations of the independent claim.

***Response to Arguments***

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

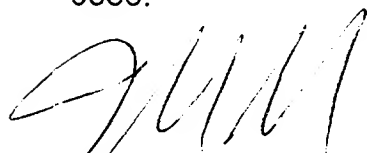
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

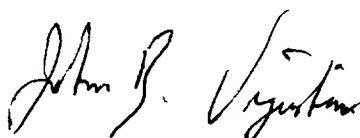
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Jmm  
August 11, 2003



John B. Vigushin  
Primary Examiner  
Art Unit 2827